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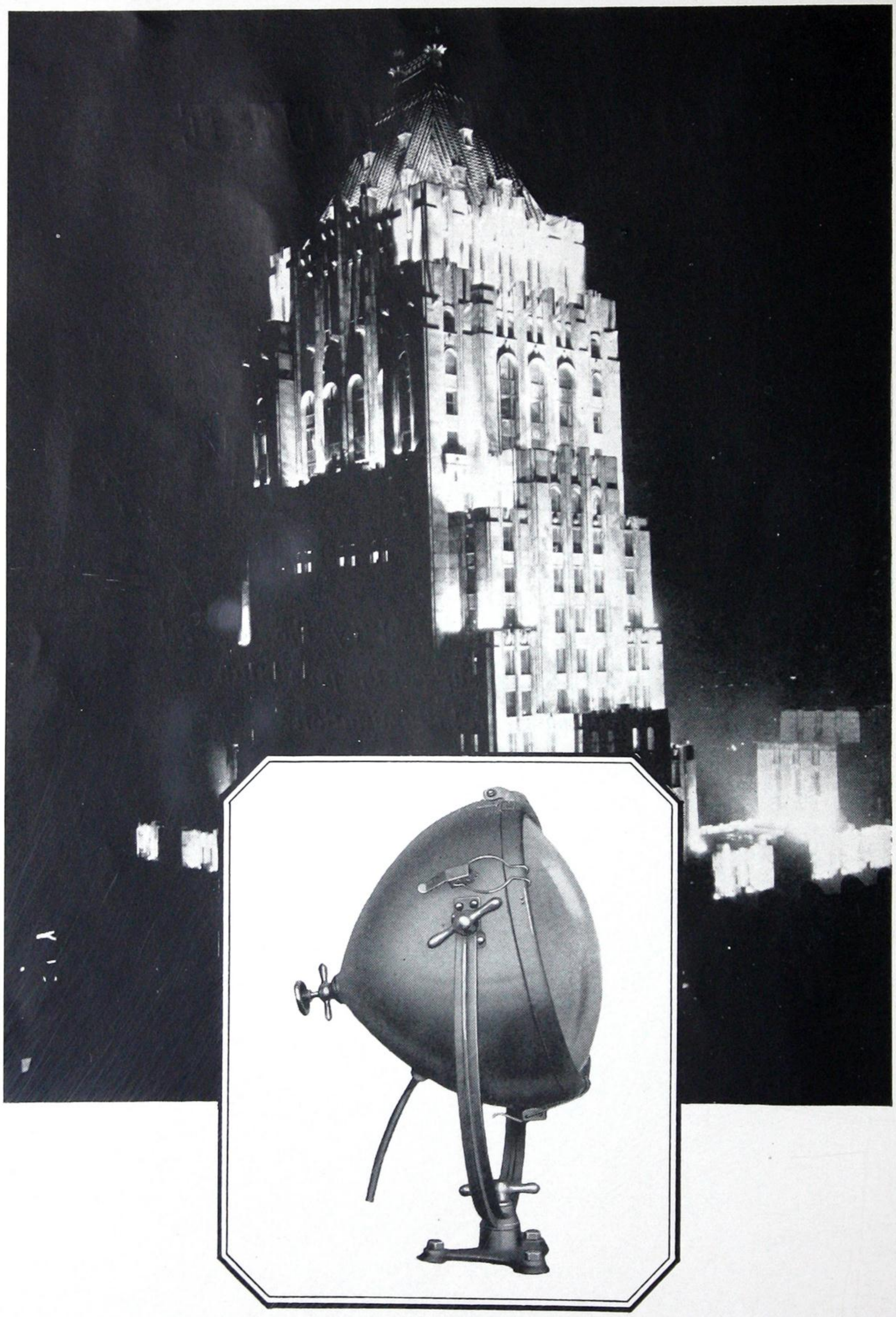
ARCHITECTURE OF THE NIGHT

A series of articles published by the General Electric Company to suggest the possibilities of architectural illumination

GENERAL ELECTRIC COMPANY
SCHENECTADY, NEW YORK



THE FISHER BUILDING, DETROIT, MICHIGAN, FLOODLIGHTED BY
G-E NOVALUX FLOODLIGHTING PROJECTORS

Raymond M. Hood Predicts "Architecture of the Night"

SEES FASCINATING POSSIBILITIES IN NIGHT ILLUMINATION

COLOR, PATTERN AND EVEN "MOVEMENT" MAY BE ATTEMPTED

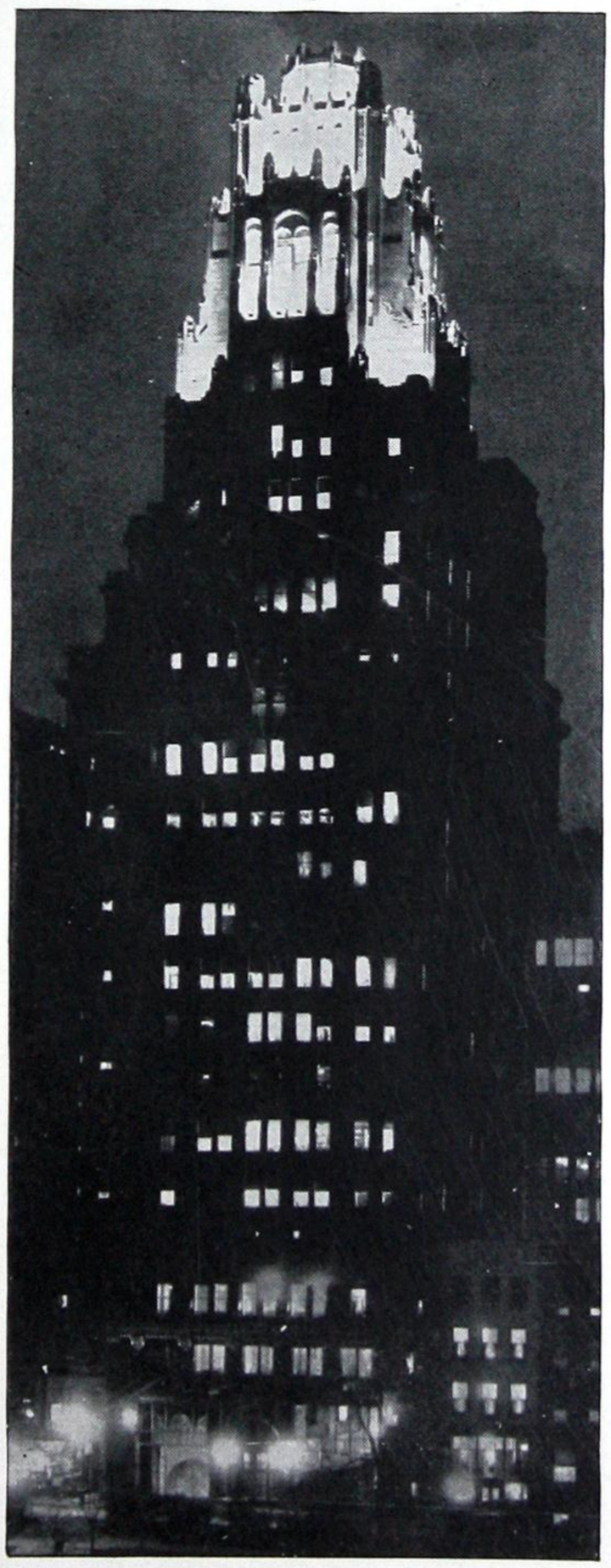
IT is the privilege of the General Electric Company to present this significant interview with Mr. Raymond M. Hood. Night illumination—the "Architecture of the Night"—is a subject of immediate interest to all architects of important buildings and one to which Mr. Hood has devoted thoughtful attention. It is a new branch of the art and fully deserves the open-minded consideration that is being given to it by acknowledged authorities. While many of the ideas here presented for the first time are of far-reaching import to professional practice of the future, it may be that even the present year will see the brilliant fulfillment of some of Mr. Hood's glowing predictions.

"The possibilities of night illumination have barely been touched," said Mr. Hood. "There lies in the future a development even more fantastic than anything that has ever been accomplished on the stage. Up to the present, we have contented ourselves mainly with direct and flood-lighting of varying intensity. There is still to be studied the whole realm of color, both in the light itself and in the quality and color of the reflecting surfaces, pattern studies in light, shade and color, and last of all, movement.

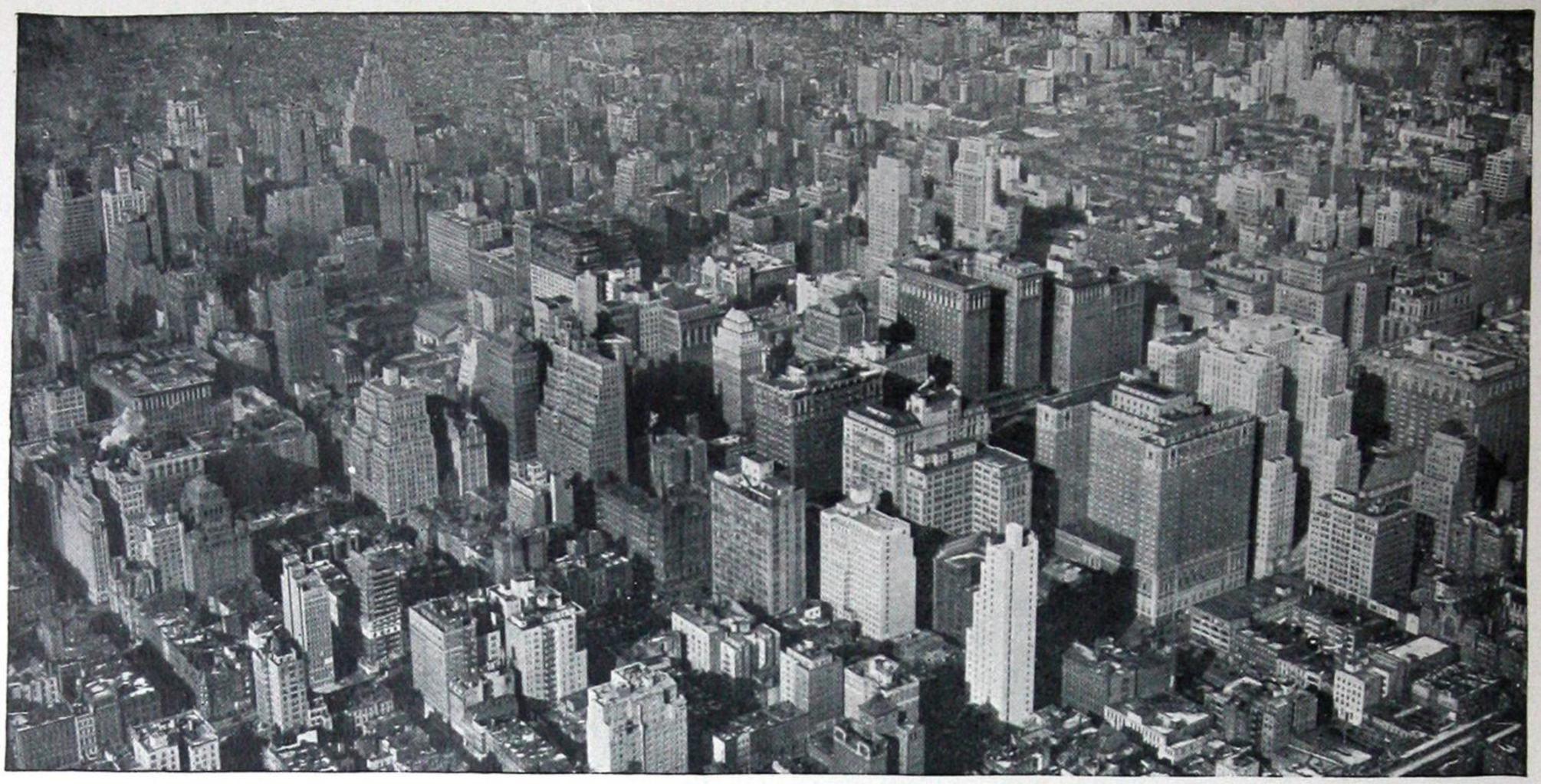
"When I was studying the lighting of the Radiator Building, I tried, with the help of Mr. Kliegel, a few experiments that opened my eyes to what might be done. We tried multi-colored revolving lights and produced at one time the effect of the building's being on fire. We threw spots of light on jets of steam rising out of the smoke-stack. Then again, with moving lights, we had the whole top of the building waving like a tree in a strong wind. With cross-lighting, that is to say, lighting from different sources and different directions across the same forms, the most unusual cubistic patterns were developed. All of this, however, was experimental, as we did not feel that either our knowledge of the art or the perception of the public was at a point where it would be wise to attempt extravagant and exotic effects. It was not a lack of courage or nerve that held us back, merely the question of taste, on account of the building's being in such a prominent location.

"At present the art is new, our knowledge very scant, and we all play safe. For example, daylight—sunlight—is constant from a single source and in a single direction. That is what brings out the modeling and massing of a building, as in everything else, as we understand it. So at night we follow the same rule, merely reversing the direction of light, turning it up instead of down, although in Classic architecture we frequently use long, horizontal bands lighting down or outlining our architecture with lines of light. The general tendency of all of this lighting is to flatten out the modeling and relief, unless it is thrown across a projecting band as in the case of a building with strong projecting cornices lighted from below. Such a condition reverses the daylight effect and usually upsets and otherwise disconcerts the composition of the architectural forms. For that reason, with vertical lighting from below, unless a horizontal member can be so studied that it composes either right side up or upside down,—an extremely difficult thing to do,—it is safer to suppress it or, to put it another way, to illuminate only buildings where these horizontal members do not exist.

"Vertical lighting from below adds the element of mystery, as the fading out of lights from the bottom to the top exaggerates the perspective, and seeing the building disappearing up into the night



UNDER G-E FLOODLIGHTS, THE GRACE AND DIGNITY OF THE AMERICAN RADIATOR BUILDING CARRY AS IMPRESSIVE A MESSAGE BY NIGHT AS BY DAY.



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NEW YORK BY DAY—A "LOST CITY" BY NIGHT. LET YOUR IMAGINATION PLAY WITH THE EFFECT OF COLOR, PATTERN, AND MOVEMENT WHICH MR. HOOD PREDICTS NIGHT ILLUMINATION WILL GIVE TO THIS ARCHITECTURAL MASS.

gives it an increased height. It follows, therefore, that the type of architecture that is the *most easy* to illuminate successfully is what can be called our American perpendicular, as the lights can be arranged to stream up the vertical forms of the building, gradually disappearing into the night, and the set-backs and terraces provide ideal places for the operation of the lights.

"I have spoken of the possibilities of cross-lighting. I recently saw an extraordinary photograph by Steichen where cross-lighting on a regular arrangement of lumps of sugar on a flat surface produced the most astonishing effect of a Scotch plaid. The same principles can be applied to the forms in a building, but it must always be remembered that the intensity of light and possibility of effect are increased if the shadows are not completely destroyed, as it is the combination of light, shade and shadow that gives the pattern.

"One of the first criticisms that can be brought against the ordinary methods of floodlighting is that they merely produce glaring, unbroken surfaces in which all texture in form and pattern is lost and the only effect produced is that of the light against the surrounding darkness. All of this is well and good, but it does not attempt to realize or make the most out of the limitless possibilities in the art.

"There is also the question of the character, texture and color of the surface to be lighted. To take again the case of the Radiator Building, the richness, depth and quality of color (I can say this modestly as it was almost accidental) are produced by an amber light thrown on a metallic pure gold surface. Certainly, among the other buildings, this color has a distinction and a quality that is very mysterious. The study of details of a building in night lighting is relatively unimportant. Almost the only effect seen is the contrast of light and darkness, and this effect is always so vivid and striking that masses are all that count in the picture.

"Eventually, the night lighting of buildings is going to be studied exactly as Gordon Craig and Norman Bel Geddes have studied stage lighting. Every possible means to obtain an effect will be tried,—color, varying sources and direction of light, pattern and movement. In this last case, I cannot even see any logical reason why a building should not be made to move and flutter. There is nothing more shocking or astonishing in the idea than there is in hearing over the radio the voice of a man in England, who by the accepted standards of one hundred years ago was completely out of sight, range and mind.

"At present we are in the A, B, C stage of illumination. If we want to see something, we turn a light on. Anyone who has seen the color organ that has been played in some of our concert halls can realize that the illumination of today is only the start of an art that may develop as our modern music developed from the simple beating of a tom-tom."

Corbett Advises Designing Buildings for Night Illumination

"ARCHITECTURE OF THE NIGHT" SHOULD NOT BE AN AFTER CONSIDERATION BEST RESULTS OBTAINED WHEN INCORPORATED IN ORIGINAL PLANS

THE General Electric Company takes pride in presenting the constructive suggestions and ripe judgments of Mr. Harvey Wiley Corbett. Mr. Corbett is one of the first to give serious consideration to the exterior illumination of buildings. He has studied this phase of architectural design very deeply, and his knowledge and personal experience give unquestioned authority to his opinions. In the following interview he emphasizes the importance of designing buildings with a view to the best effects of floodlighting, and points out the disadvantages of leaving these considerations to the outcome of chance.

"The troubles of the poor architect never diminish but only multiply. Just when he thinks he has mastered the principles of the architecture of the Ancients, a whole lot of new commercial and mechanical problems are thrust upon him and he has to revamp all his ideas of architectural form, proportion, and mass to meet the practical needs of the day.

"A Greek temple basking in the sunshine of a Mediterranean summer day and reflected in the waters of an azure sea, inspires him with the hope of some day reproducing such a vision in his own country. The first opportunity to reconstruct this delightful vision is a twenty-story loft building capped by an elevator pent house and pressure tanks, and his vision of ancient Greece restored ends in a galvanized iron temple enclosing the aforementioned pent house and tanks. Now a newer and still more confusing problem has been added to his already complete store of problems. Night illumination of buildings has become a very popular and effective element in design, particularly in buildings of the skyscraper type. Having designed his architecture, cornices, mouldings, and details with due regard for an angle of sunshine falling from above at 45 degrees over the left shoulder, he now finds himself confronted with beams of night light shooting upward at a dozen different angles, completely reversing his entire design problem so that every carefully studied shadow becomes a high light and every studied proportion is turned upside down. The question arises, 'can we design our buildings to be equally effective for the eight or ten hours of daylight and at the same time be architecturally satisfactory for a few hours of specially illuminated night time?'

"From a critical point of view, more attention is given, more comments are made, more interest is aroused when buildings are artificially illuminated than during the natural daylight. Night illumination attracts attention like a spotlight

FLOODLIGHTING IS NOT TO BE RESTRICTED TO THE LARGEST CITIES AS EVIDENCED BY HELMLE & CORBETT'S EFFECTIVE DESIGN FOR THE ILLUMINATION OF THE NEW PENNSYLVANIA POWER & LIGHT CO. BUILDING AT ALLENTOWN. G-E FLOODLIGHTING WILL TRANSFORM THIS BUILDING INTO A MAGNIFICENT BEACON.

on a stage. Buildings are noticed and commented on which otherwise would be passed by the casual observer without a thought, so that from one point of view the problem of architectural design with respect to night illumination is a very serious one, demanding a great deal of study and research. It will undoubtedly become of ever-increasing importance and one which no architect can afford entirely to overlook. Fortunately modern commercial demands have made many of the old familiar architectural forms which have come down to us from a past generation inappropriate in modern work. In high buildings particularly, the cornice has practically disappeared. Many other familiar forms have gone with it. Mass, proportion, silhouette, and color have become the commanding factors, and they are not so materially influenced by reversing the angle of light; but we cannot let the matter rest with chance, simply hoping that the result of night illumination may be good. We must design those portions of the building which are to be illuminated with all due respect and regard for this new element which has become so important a factor in the appearance of the building.

HELMLE & CORBETT'S FAMOUS BUSH TOWER. G-E FLOODLIGHTING ADDS A MYSTIC QUALITY TO THE BEAUTY OF THIS BUILDING AFTER DARK, AND AS MR. CORBETT SAYS, "GIVES THE ILLUMINATED PORTION THE APPEARANCE OF A JEWEL IN A SETTING."

"It happens too often in the design of buildings that illumination is an after consideration. The architect finds that spaces on which illumination is possible are not necessarily pleasing in mass and proportion, whereas with the thought in mind of planning these spaces for illumination, simple modifications in the plans would have made these same spaces pleasing in proportion. Architectural detail has not as much significance as one might imagine. Since the illuminating element is composed of many sources of light, the shadows are seldom equally divided, and the effect is more one of diffusion than of exactness.

"The problem, to begin with, is one of mass and proportion. That portion of the building which is illuminated stands out clearly against a dark sky and is separated quite distinctly from the portion of the building unilluminated. Special study must of course be given to the line of transition between these two portions. There is a tendency for the illuminated part to float unsupported and thereby lose its structural significance. The form of the illuminated portion should be so tied in with the rest of the building that it should appear as a jewel in a setting, forming a coherent part of the whole structure. In order to illuminate a building, two methods are generally in vogue,—one by means of floodlights placed on the set-backs or terraces, and the other by means of similar units placed on other buildings across the street or placed on the ground. The latter form is rarely possible in connection with commercial buildings, but it has been used with great success in the lighting of government buildings and other public structures. It will be readily seen that if there is a choice in the location of the set-backs and their depth, it has a very direct influence on the effectiveness of the lighting."

Character in Architecture Emphasized at Night

PERTINENT SUGGESTIONS BY GEORGE L. RAPP, ARCHITECT, SHOW THE DRAMATIC POSSIBILITIES OF FLOODLIGHTING

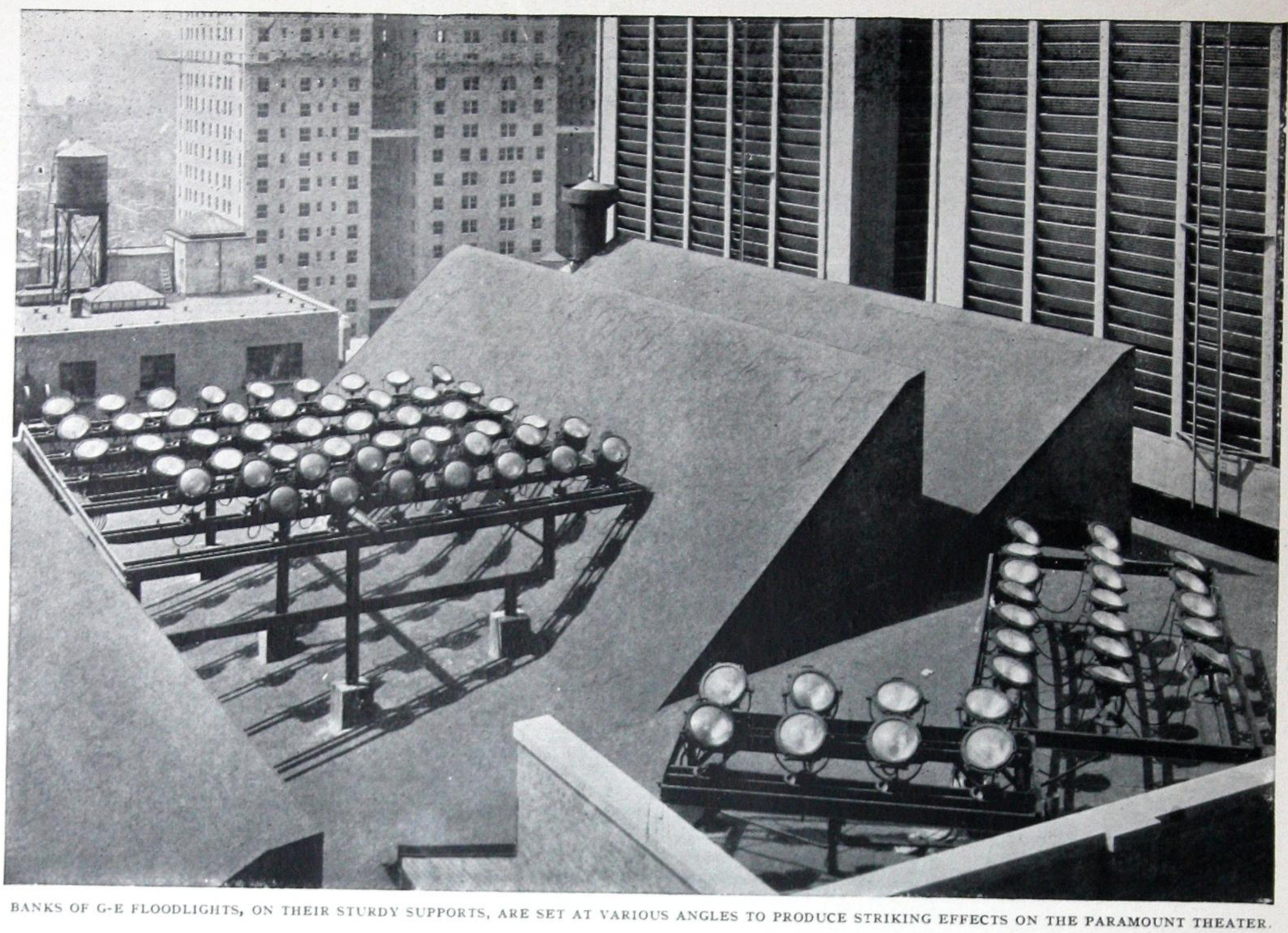
IN present-day architecture the designs of buildings are frequently such that it becomes a very desirable and very feasible part of the project to illuminate all or portions of the buildings and to present to view the beauties of the buildings at night as well as during the day. It is not only possible to light up an entire building with floodlights, but in many instances the design of the building is such that it is much more desirable to pick out certain features of the building to accentuate and at the same time produce silhouettes which bring out the character of the structure.

There are many effects which floodlighting can produce, such as variation in color, combinations of colors, and intermittent dimming effects, as well as a varying intensity of light and color. The selection of the type of floodlighting depends largely on the character of the building, as well as on the nature of the surface materials, which vary greatly in light absorption and light reflection. In considering color for floodlighting purposes, efficiency has great bearing on the selection, since in using the darker colors, such as blue, efficiency is as low as 5 per cent. This indicates that much more current must be supplied with the darker colors than with the lighter ones in order to produce effective results. Then again the matter of visibility must be taken into account. This has to do with the possibility of seeing a building lighted in blue at a great height and through atmosphere containing either smoke or fog. Thus illumination in brighter shades of color naturally has the greatest value. However, if an installation is made in which the three primary colors, blue, red and yellow, are in proper proportions, every color in the spectrum can be produced by using constantly rotating dimmers; and if the building surfaces to be lighted are not too far removed from the viewing point, this lighting is very effective. With the three colors on at the same time, a white light will be produced which bears a very close resemblance to daylight. The present-day "white light," as electrically produced, is far removed from sunlight or daylight, and unless some color is introduced it may produce glare. This can easily be overcome by lighting a surface from two different angles, particularly if the surface is somewhat broken up with reveals or details in relief.

In using colors for lighting buildings, illumination from two angles and the use of complementary colors will produce striking effects. Here again visibility must be carefully considered, as in all color lighting. Until such time as we can successfully produce an artificial light resembling daylight, the best effects in floodlighting will be produced by using two colors as already outlined. However, when we do produce an artificial light more closely resembling daylight, we shall be able to light a building so as to exhibit all of the lights and shadows which appear in a building during the day and which were uppermost in the mind of the designer while planning the structure.

THE STEPPED RANGES OF G-E FLOODLIGHTING ON THE PARAMOUNT THEATER AND OFFICE BUILDING, NEW YORK, EFFECTIVELY ILLUSTRATE THE IDEAS OF THE ARCHITECTS, C. W. AND GEO. L. RAPP.

In designing floodlighting systems, great care must be taken in locating the floodlighting units so that the desired effect of the gradations of light on the surface will be obtained. This also involves the necessity for careful analysis of the light-absorbing and light-reflecting qualities of the material, and the distance and angle from which this surface is to be lighted. The use of setbacks in modern American architecture serves admirably the purpose of floodlighting in that it is much easier to locate the units properly, and it is also true that present-day



BANKS OF G-E FLOODLIGHTS, ON THEIR STURDY SUPPORTS, ARE SET AT VARIOUS ANGLES TO PRODUCE STRIKING EFFECTS ON THE PARAMOUNT THEATER.

architecture nearly always embodies some motif which should very properly be brought out by night illumination.

In addition to what is commonly known as floodlighting, many striking forms of illumination can be produced. For instance, towers of light with light on the inside, such as the ball of light atop the Paramount Building in New York, afford possibilities of floodlighting. Another scheme is to throw floodlight on smoke or steam coming out of an orifice from the top of a building, either in a single color or in a combination of colors. Still another possibility is that of constructing a large shaft equipped with mirrors and having colored light thrown on the mirrors from various angles, as well as the possibility of lighting the water in fountains, using varying colors.

Other notable examples of the floodlighting of recent buildings, in addition to the new Paramount Building already mentioned, are the "Times Square," B. F. Keith theater and office building in Cleveland, and the new Rialto Theater, Joliet, Ill. These three buildings illustrate the use of different systems of floodlighting. Architectural floodlighting is more or less governed by the actual composition and design of the building which is to receive this lighting effect. It is the writer's opinion that lines that form an integral part of the composition of the structure should also play the same part when the building is illuminated at night; in other words, the structure should always be the same in composition, both night and day, and the flood of light should tie in and be part of the design of the building.

On the Paramount Building the floodlighting is arranged to light all of the set-backs above the 19th floor, and an added effect is produced by having a large amount of light contained in the glass ball surmounting the apex. A notable contrast is provided in this lighting by having stud lighting on the hands and the minute points of the large clocks on the top of the structure. In the Keith Theater in Cleveland, it was desired to accentuate the large arched window decoration at the top of the building. In the Rialto Theater at Joliet (as will be the case with the Press Club in Washington) floodlighting consists of lighting the large entrance niche in three colors—red, green, and blue—controlled by the operation of an automatic motor-operated dimmer, which produces a very striking effect in the semi-domical niche.

The writer is of the opinion that the light can always be so arranged as to emphasize motifs of design. Modern floodlighting has this advantage and has ceased to be a mere throwing of light on the face of a building.

"Night Architecture" Will Be Perfected through the Coöperative Efforts of Architect and Illuminating Engineer

By WALTER D'ARCY RYAN, *Director of Illuminating Engineering Laboratory, General Electric Company; Director of Illumination, Panama-Pacific International and Brazilian Centennial Expositions.*

IN a recent article in THE ARCHITECTURAL FORUM, Mr. Harvey Wiley Corbett states:

"It happens too often in the design of buildings that illumination is an after consideration. The architect finds that spaces on which illumination is possible are not necessarily pleasing in mass and proportion, whereas with the thought in mind of planning these spaces for illumination, simple modifications in the plans would have made these same spaces pleasing in proportion."

NIGHT VIEW OF THE TOWER OF JEWELS AND MANUFACTURERS' BUILDING, PANAMA-PACIFIC INTERNATIONAL EXPOSITION. THIS ILLUSTRATES THE PRESERVATION OF DEPTH, OR THE THIRD DIMENSION IN LIGHT, BY A COMBINATION OF WHITE FLOODLIGHTS AND COLORED RELIEF LIGHT.

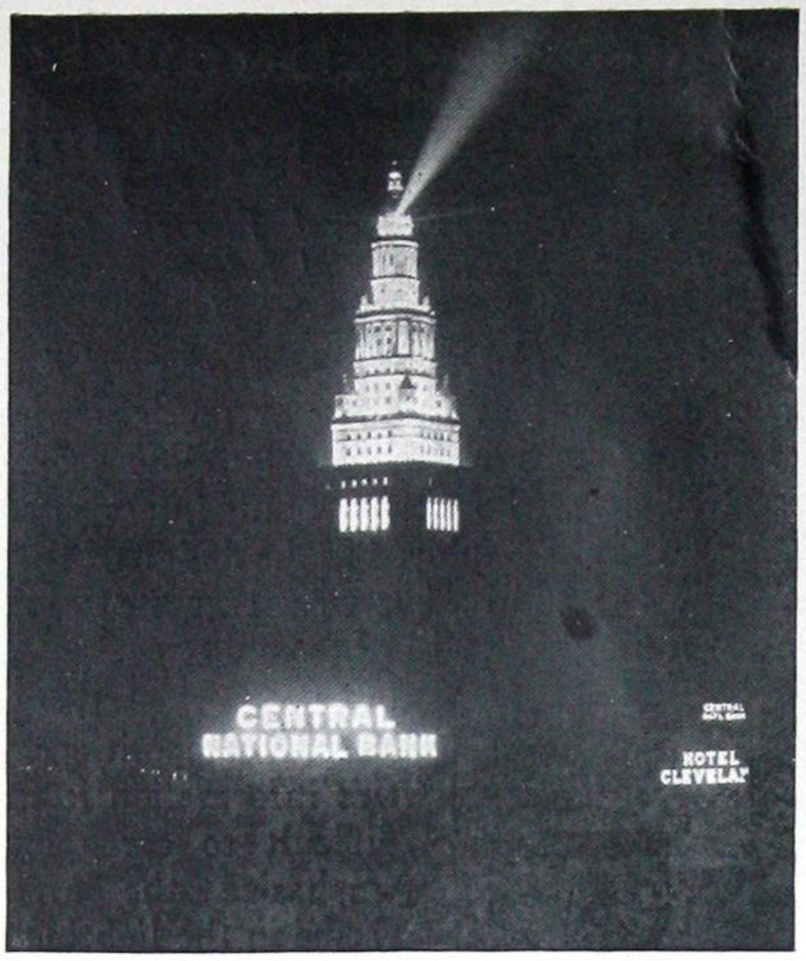
The above aptly expresses the need of more careful consideration of floodlighting during the evolution of the building's design. The illuminating engineer is thoroughly familiar with the limitations in the design of lighting apparatus. Through experience, he has learned to use the available tools in the most efficient manner. The architect may conceive the effect, but it remains for the engineer to produce it in a practical way. Far too often the engineer is not consulted until it is too late to alter structural plans to accommodate necessary apparatus.

The well-trained illuminating engineer of to-day can talk to the architect in his own language, and he is competent to conceive artistic lighting effects as well as to execute them. At the Panama-Pacific Exposition, in San Francisco, the entire responsibility for the planning and production of the illumination was intrusted to the illuminating engineer. The wisdom of such action was attested by the classification of the lighting of the Exposition by the International Jury of Awards as a "decorative art," largely because it appealed to the imagination and feelings of the public, and carried a message much the same as painting or music. These effects were made possible largely by close coöperation with the architects, who were not only interviewed as to choice of motif to be employed in the design of the lighting standard and fixture, but were requested to express the general feeling they wished to convey to the observer by their respective architectural compositions. With this information it was not difficult to carry out and emphasize the architect's theme in the lighting effect.

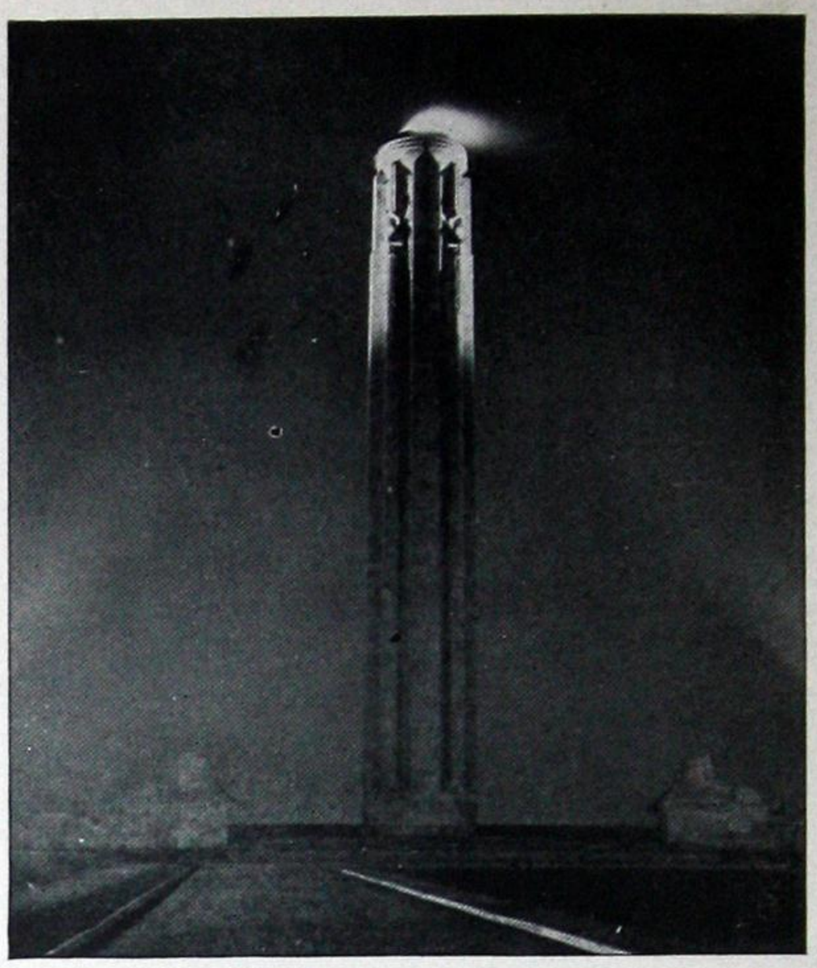
One of many noteworthy examples of this willingness to coöperate may be cited. The rough travertine finish of the Exposition's surfaces was adopted only after the need for such a diffuser and reflector of light had been demonstrated and laboratory tests actually made on samples. In modern structures this question of texture is equally important. It should be remembered that the building is seen by reflected light, and, while a smooth surface may reflect the light from the sky to advantage, at the same time it would act as a mirror to throw the rising light from floodlights to the sky instead of back to the observer's eyes.

NIGHT VIEW OF THE CAPITOL AT WASHINGTON, SHOWING SPECIAL LIGHTING EFFECTS USED DURING THE CONFERENCE OF LIMITATION OF ARMAMENTS.

It is inspiring to read the articles by Mr. Raymond M. Hood and Mr. George L. Rapp in recent issues of



THE UNION TERMINALS BUILDING, CLEVELAND, OHIO. THE ARCHITECTURAL DESIGN, ADMIRABLY SUITED TO FLOOD-LIGHTING, IS SERVED BY 239 G-E UNITS OF VARIOUS INTENSITIES, SO PLACED AS TO PRESERVE EVERY DETAIL OF LIGHT AND SHADOW.



G-E SEARCHLIGHTS ARE USED TO PRODUCE THIS PLEASING EFFECT OF LIGHT AND SHADOW ON THE LIBERTY MEMORIAL AT KANSAS CITY, MO. THE UNITS ARE CONCEALED BEHIND THE CORNICES OF THE ADJACENT MEMORIAL BUILDINGS.

THE ARCHITECTURAL FORUM. These men have used floodlighting on buildings of their own design and appreciate the possibilities in the correct use of high lights, shadows, colors, and even motion, provided the structure is designed for such effects. They predict "Architecture of the Night" and fortunately, the modern American skyscraper with its natural tendency toward vertical lines and set-back construction is in line with this development.

In designing floodlighting the character of the building as well as of the surroundings must be considered. The classical public edifice demands simplicity in lighting, and color would be out of place except as a relief to shadows. The many cornices, capitals, and applied ornamentations would be distorted by a rising light. Best results are obtained when the light emanates from a higher neighboring structure with about three-fourths of the volume coming from the left of the observer and one-fourth from the right to soften the shadows cast by the former.

One is impressed by the dominating height and mass of the modern skyscraper. The architect has accomplished this largely with vertical lines which, when high-lighted at night, further accentuate the effect. Necessarily these towering facades must be illuminated from below with high intensities fading toward the top. Such lighting tends to exaggerate the height of the structure, but it appears to best advantage when it can be surmounted by a colored, or a much more intensely illuminated, element. It is this element in the form of a spire, tower, lantern, or dome, that is seen by the greatest number of people and from the greatest distances. It is the jewel of the main structure and deserves lavish treatment and, fortunately, because of its reduced area it can be given many times the light intensity of the main structure at a relatively small increase in over-all cost.

Long viewing distances call for high intensities and white light. Red, orange, and amber lighted surfaces have fairly good carrying power, and green may sometimes be used to advantage. Blues and purples, which are so effective for stage lighting, can scarcely ever be used for exterior lighting without excessive cost except in very small areas or where there is no complication from other light sources. This is due, largely, to the high absorption of blue or purple screening media which usually exceeds 95 per cent.

The relative wattages required for the different colors for equivalent effects depend on local conditions, the nature of the surroundings, and the texture and color of the surface to be illuminated. They may vary as much as five to one between white and colored light on a light surface and again there may be no difference, as in the case of the illumination of a red brick building. Red brick reflects mostly red light, so it matters very little whether all other colors are screened out at the floodlight door or by absorption at the brick itself. The former method is preferred, because the impurities, lime and mortar stains, etc., are usually accentuated by white light, and the added brightness of these reflections overpowers the dimmer red rays. The engineer takes into consideration the reflection coefficients, textures, and colors of the surfaces to be illuminated.

In the abbreviated scope of this article, only sufficient high lights have been touched to excite an interest in the subject of floodlighting and point out the functions as well as the need for coördination of the work of the architect and the illuminating engineer.

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